

#3689  
R

# WATER QUALITY MEMORANDUM

## Utah Coal Regulatory Program

---

March 23, 2011

TO: Internal File

THRU: Daron R. Haddock, Permit Supervisor *DRH*

FROM: James D. Smith, Environmental Scientist III *JS 24 March 11*

RE: 2010 Fourth Quarter Water Monitoring, PacifiCorp, Deer Creek Mine, C/015/0018, Task ID #3689

The Deer Creek Mine monitoring plan is described in Appendix A of Volume 9 of the MRP.

1. Were data submitted for all of the MRP required sites? YES ☒ NO ☐
2. Were all required parameters reported for each site? YES ☒ NO ☐
3. Were any irregularities found in the data?

Parameters listed below were more than two standard deviations from the mean. An asterisk (\*) indicates this is not a parameter or site required by the MRP. Parameters in bold type were also more than two standard deviations from the mean during the previous quarter.

### Streams

YES ☒ NO ☐

DCR04 Oct: **flow**;  
DCR04 Nov: **flow**;  
DCR04 Dec: **flow**, cation - anion balance;  
DCR06 Oct: **flow**;  
DCR06 Nov: **flow**;  
DCR06 Dec: **flow**;  
HCC04 Dec: **cation - anion balance**;  
ICA: October: TDS.

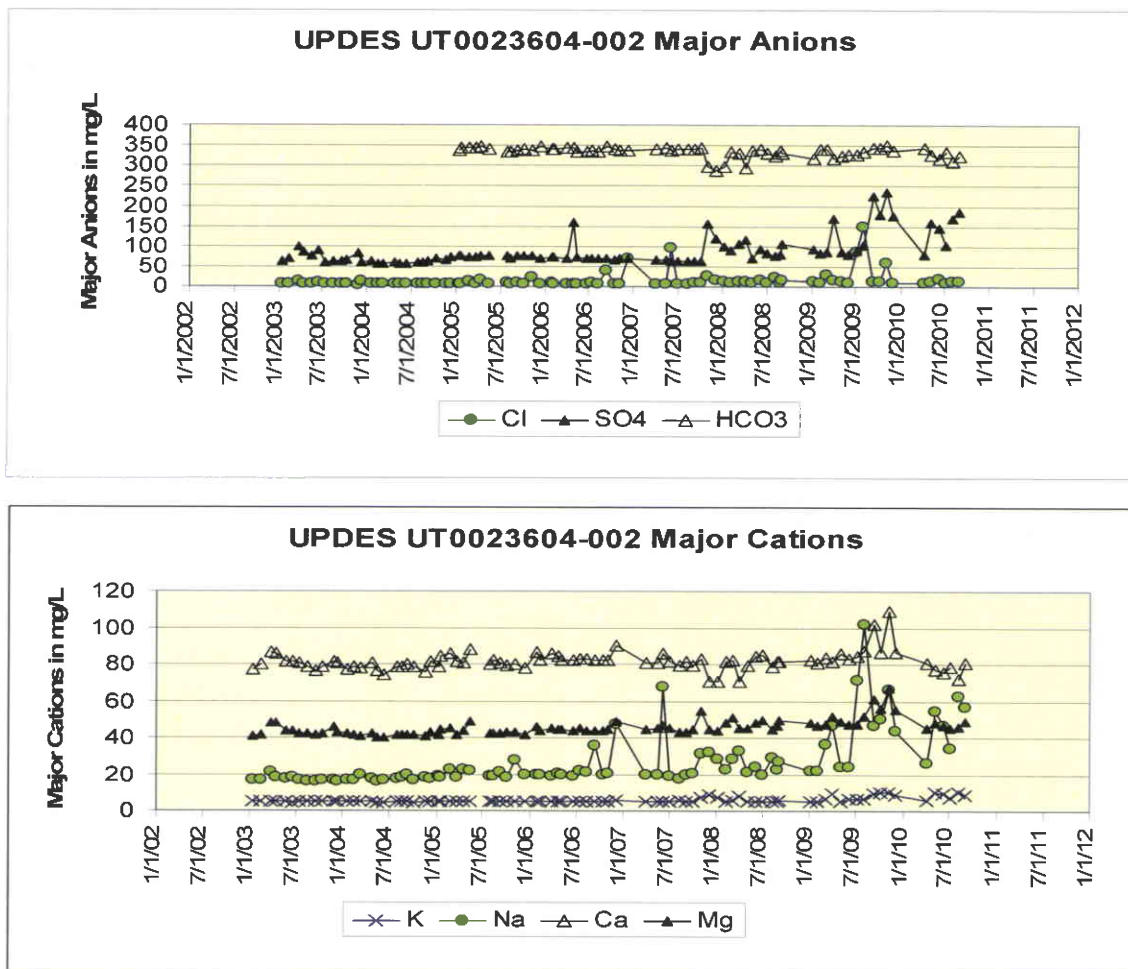
### UPDES

YES ☒ NO ☐

UT0023604-001 Oct: bicarbonate as CaCO<sub>3</sub>.  
UT0023604-001 Nov: bicarbonate as CaCO<sub>3</sub>.

UT0023604-002 Nov: cation - anion balance.

Recently, potassium values have frequently been outside two standard deviations from the mean at UT0023604-002, but – as can be seen on the following charts – with the exception of bicarbonate, major ion concentrations have tended to fluctuated upwards in recent years.



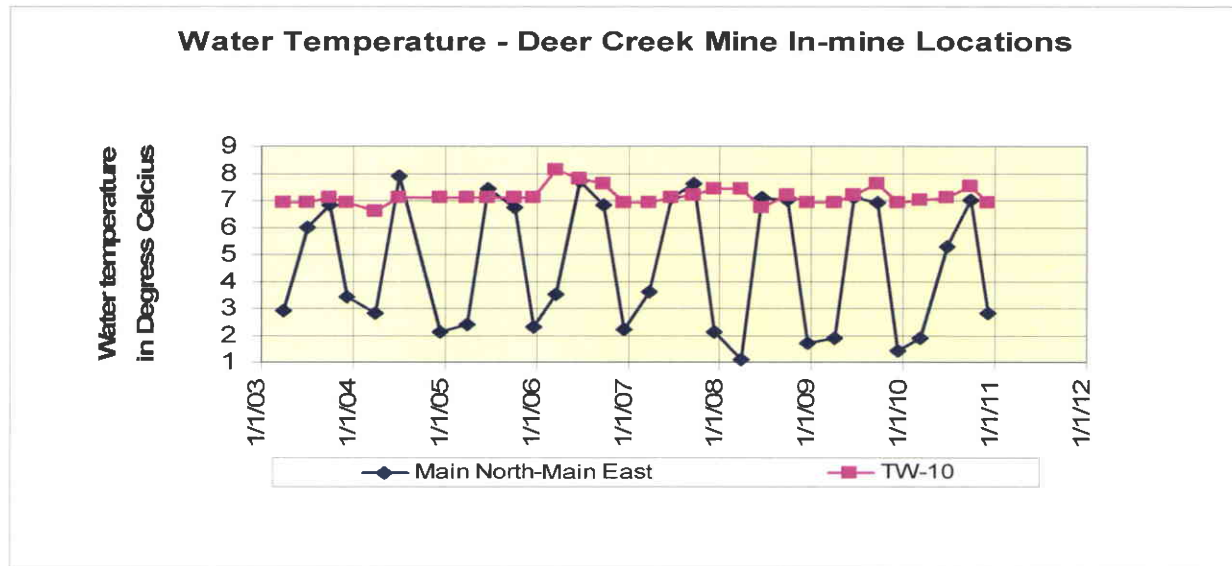
In-mine

YES ☐

NO ☒

The water temperature at Main North Main East varies seasonally year-after-year (see following chart), indicating that this in-mine source is most likely fed by infiltration of surface

water rather than draining surrounding strata. The temperature at TW-10 shows some seasonal variation but it is not as definitive as at Main North Main East.



### Springs

YES ☒ NO ☐

Burnt Tree Spring Oct: bicarbonate as  $\text{CaCO}_3$ , cation - anion balance;

Elk Spring July : **acidity\***;

Sheba Oct: bicarbonate as  $\text{CaCO}_3$ ;

Ted'sTub Oct: D-Ca, D-K;

79-2: D-Ca;

79-10: L-pH\*

79-28: cation - anion balance;

79-34: **D-Mg, D-Na, bicarbonate as  $\text{CaCO}_3$ , Cl, total alkalinity\***;

79-35: cation - anion balance;

80-48: D-Na;

89-65: water temperature, D-Na, cation - anion balance;

JV-9: water temperature, flow, D-Na, **acidity\***, lab electric conductivity\*;

MF 7: **D-Na**;

MF 10: **D-Ca**;

MF19B: D-K, Cl, TDS;

MF 219: **flow**;

RR 5: **total hardness as  $\text{CaCO}_3$** ;

RR 15: D-Ca, total hardness as  $\text{CaCO}_3$ ;

SP1-26: water temperature, lab pH\*;

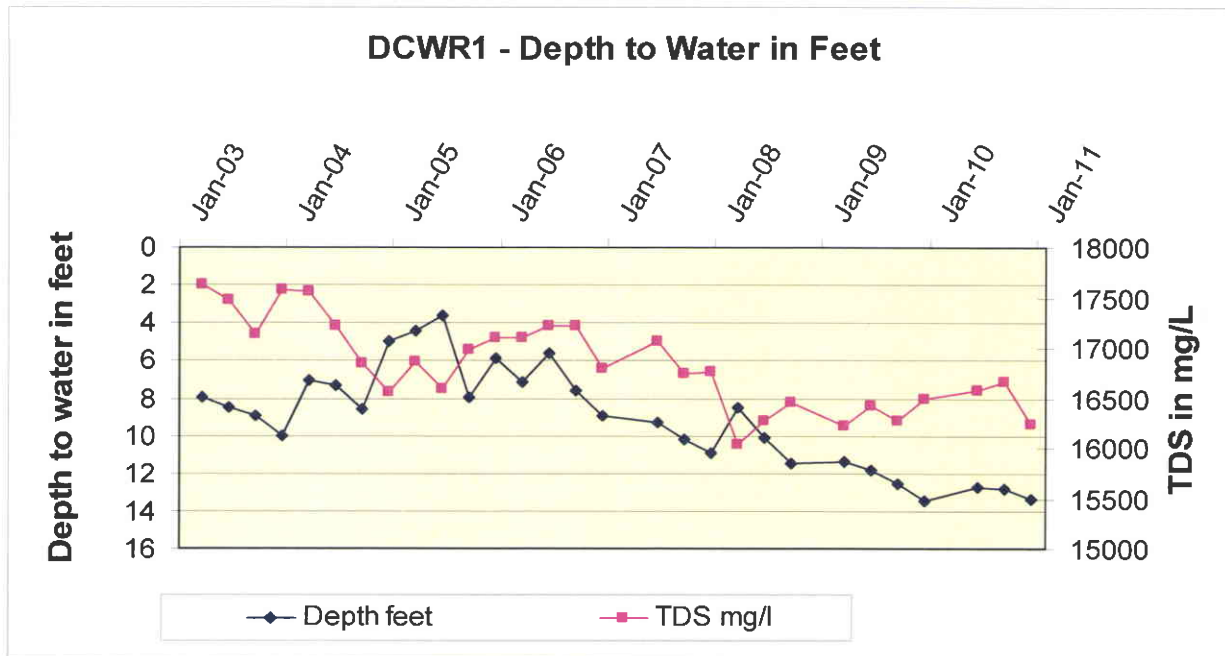
SP1-29: water temperature;  
UJV 101: D-Na, total alkalinity\*;  
UJV 206: lab pH\*, lab electric conductivity\*;  
EM Pond: **water temperature, D-Ca, total hardness as CaCO<sub>3</sub>, lab electric conductivity\***;  
Grant Spring: **bicarbonate as CaCO<sub>3</sub>, total alkalinity\***;  
Little Bear: water temperature, D-Ca, D-Mg, total hardness as CaCO<sub>3</sub>;  
Mine Site 4: Cl;

#### Wells

YES ☒ NO ☐

CCW2A Oct: depth  
CCW2A Nov: depth  
CCW2A Dec: depth  
DCWR1: D-K, **cation - anion balance**;

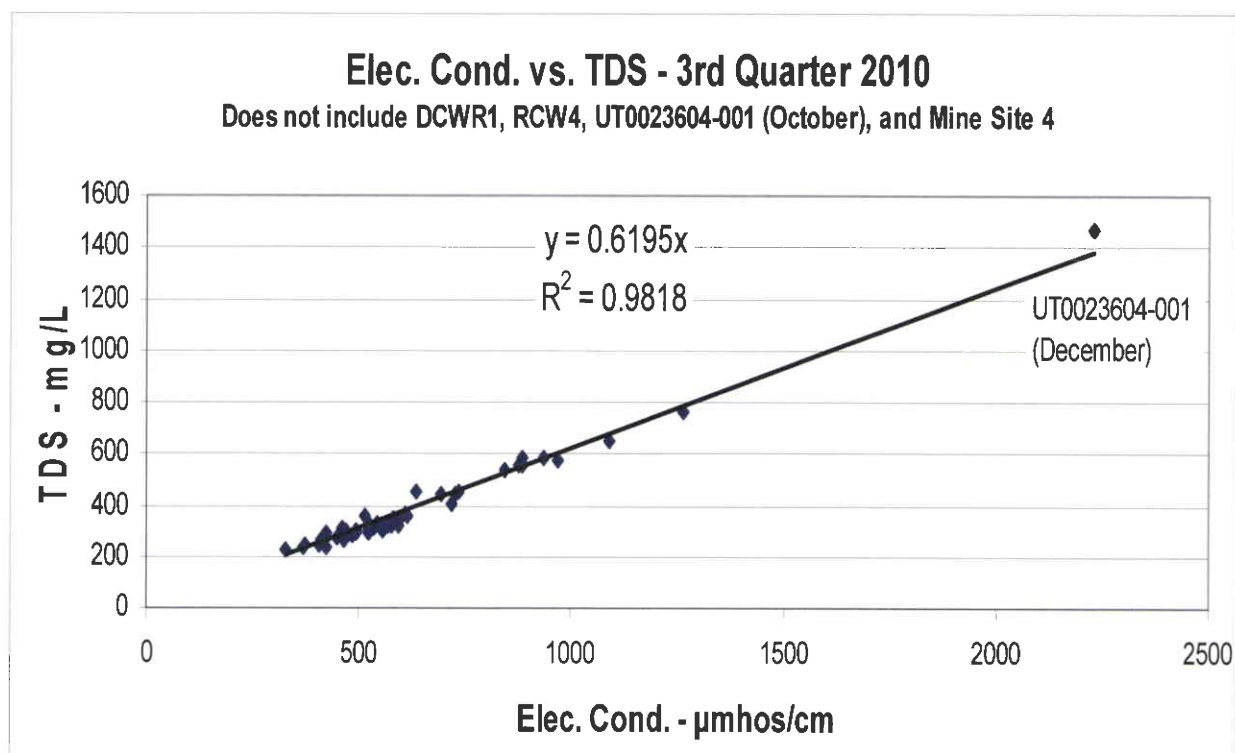
Although it hasn't been flagged as varying from the mean by more than two standard deviations, water level at DCWR1 has been dropping since 2006 (following a small rise in 2004-2005). TDS was dropping at a similar rate, but now appears to have stabilized. These changes



are probably from factors other than disposal of waste rock at this site: a similar drop in water level is seen at WCWR1 at the Cottonwood/Wilberg Mine Waste Rock Disposal Site.

### TDS/field electric conductivity ratios – all sites

The TDS/field electric conductivity ratio typically falls between 0.55 and 0.76 for dissolved solids concentrations found in natural waters. As the following chart shows, data for these two parameters submitted for the Fourth Quarter 2010 at the Deer Creek Mine generally result in a ratio that falls within this range: DCWR1, Mine Site 4, UT0023604-001 (October), and RCW4 are not included in the trendline calculation.



DCWR1 (TDS/field electric conductivity = 0.95), Mine Site 4 (0.97), UT0023604-001 (0.88 for October), and RCW4 (0.77) lie outside the upper end of the range (springs 80-47, 89-67, and 79-29 are at or just below the lower end). The comparison of the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> Quarter 2010 values in the following table indicate Mine Site 4 and DCWR1 have consistently high values for the TDS/ field electric conductivity ratio.

	2 <sup>nd</sup> Quarter 2010			3 <sup>rd</sup> Quarter 2010			4 <sup>th</sup> Quarter 2010		
	EC (field) µmhos/ cm	TDS – mg/L	TDS/ EC.	EC (field) µmhos/ cm	TDS – mg/L	TDS/ EC.	EC (field) µmhos/ cm	TDS – mg/L	TDS/ EC.
RCW4	498	315	0.635	1349	1030	0.763	1400	1082	0.773
MINE SITE 4	2620	2352	0.898	2600	2264	0.870	2450	2385	0.973
MF 7	545	340	0.624	354	313	0.884	517	362	0.700
MF 213	504	301	0.597	320	285	0.890	462	312	0.675
DCWR1	17580	16575	0.943	17200	16658	0.968	17100	16242	0.950
UT0023604-001 (highest ratio for respective quarter)	2225	1337	0.601	2030	1294	0.637	807	709	0.878

**4. On what date does the MRP require a five-year resampling of baseline water data.**

Baseline analyses were performed in 2001 and are to be repeated every 5 years; baseline analyses were done in 2006 and should be done again in 2011: this schedule applies to all the PacifiCorp mines, irrespective of the permit renewal date. For the Deer Creek Mine, the last renewal submittal was due 10/07/10, and renewal was due 02/07/11.

**5. Based on your review, what further actions, if any, do you recommend?**

No further action recommended at this time.

**6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements?** YES ☐ NO ☒

**7. Follow-up from last quarter, if necessary.** NA ☒

**8. Did the Mine Operator submit all the missing and/or irregular data?** NA ☒